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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/536,917	05/31/2005	Cristian Lorenz	DE 020291	6593

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P.O. BOX 3001
BRIARCLIFF MANOR, NY 10510

EXAMINER	
WANG, CLAIRE X	
ART UNIT	**PAPER NUMBER**
2624	

MAIL DATE	DELIVERY MODE
12/31/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/536,917	LORENZ, CRISTIAN	
	Examiner	Art Unit	
	Claire Wang	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 May 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

> Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.
>
> When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare In re Lowry, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and Warmerdam, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).
>
> In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

2. Claim 9 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim 9 defines a computer program embodying functional descriptive material. However, the claim does not define a computer-readable medium or memory and is thus non-statutory for that reason (i.e., "When functional descriptive material is recorded on some

computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized" – Guidelines Annex IV). That is, the scope of the presently claimed a computer program can range from paper on which the program is written, to a program simply contemplated and memorized by a person. The examiner suggests amending the claim to embody the program on "computer-readable medium" or equivalent in order to make the claim statutory. Any amendment to the claim should be commensurate with its corresponding disclosure.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2-3, 5-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Taubin (US 6,987,511 B2).

As to claim 1, Taubin teaches a method of defining a surface or a volume in a three-dimensional data set that contains in particular medical data (Col. 1, lines 11-13), having the steps of: a) presetting of at least two starting lines (11, 13) lying in a three-dimensional space, the space being preset by the three-dimensional data set (Fig. 17 shows a polygon mesh vertex of the polygon mesh which defines the neighbor edge), b) generation of a surface structure (63) from the starting lines (11, 13) by means of a Fourier transformation (Fourier analysis on meshes; Col. 20, lines 50-67 and Col. 21, lines 1-30), c) generation of a surface (61), and particularly a surface of a volume, from the surface structure (63) (Col. 1, lines 11-13).

As to claim 3, Taubin teaches wherein a polygonization, and in particular a triangulation, of the surface structure is carried out in step c) (triangle mesh; Col. 27, lines 1-2).

As to claim 5, is the same as claim 1, except claim 5 further teaches determination of the at least one point of intersection (15) (Taubin Fig. 17 shows vertices, which are points of intersection), division of each starting line (11, 13) into part-lines (21 . . . 27) at each point of intersection, division of each part-line into sections, each part-line having the same number of sections and the location of each section in the three-dimensional space being defined by a section point, formation of point groups, each point group comprising a section point on each part-line (Taubin Fig. 17).

As to claim 6, Taubin teaches wherein the starting lines are closed (Fig. 17).

As to claim 7, Taubin teaches wherein the starting lines are closed (Fig. 17).

As to claim 8, it is the system claim of claim 1. Please see claim 1 for detail analysis.

As to claim 9, it is rejected under 35 U.S.C. 101 as mentioned above. However, the art rejection applying to claims 1-8 would still apply to claim 9 even after claim 9 over comes the 35 U.S.C. 101 above.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taubin in view of Pan et al. (US 6,272,200 B1 hereinafter "Pan").

As to claim 2, Taubin teaches wherein step b) comprises the following steps: division of each starting line (11, 13) into sections, each starting line (11, 13) having the same number of sections and the location of each section in the three-dimensional space being defined by a section point, formation of point groups, each point group comprising a section point on each starting line (in Fig. 17 edges 1730 and the vertical line going through vertex 1710 are the starting lines. Each of the above mentioned lines are divided into two sections, which are part of a mesh that reconstructs a 3D surface. The points located in Fig. 17 are vertices, which are points that forms the starting lines.), Fourier transformation of the section points in each point group (Fourier analysis on meshes; Col. 20, lines 50-67 and Col. 21, lines 1-30), generation of a surface structure by reverse Fourier transformation of the Fourier transformed section points (Fig. 7). However, Taubin does not teach addition of zeroes to the Fourier transformed section points in each point group (zero padding).

Pan teaches a Fourier approach for reconstruction of CT images using zero-padding (Col. 8, lines 3-7). Thus, Pan's zero-padding technique reads on the claimed zero padding technique. Therefore, it would have been obvious for one ordinarily skilled in the art at the time the invention was made to combine Taubin's mesh system that uses Fourier analysis for reconstructing a surface structure with the Fourier method used in Pan's zero-padding technique in order to make the Fourier-based approach more computationally efficient and allow simultaneous generation of all the required projections (Pan Col. 8, lines 4-7).

As to claim 4, Taubin teaches reconstruction of a three-dimensional data set from the measurements, presetting of at least two starting lines (11, 13) lying in the three-dimensional space, the three-dimensional space being preset by the three-dimensional data set (Fig. 17 shows a polygon mesh vertex of the polygon mesh which defines the neighbor edge). Taubin also teaches that polygon meshes are widely used in medical imaging (Col.1 lines 11-13) however does not explicitly list the type of medical imaging being a computer tomograph (1), a magnetic resonance unit or an ultrasound unit. Pan teaches a Fourier reconstruction of helical CT images using Fourier transform (Col. 1, lines 12-14). Thus, Pan's CT images reads on the claimed medical imaging being a computer tomograph. Therefore, it would have been obvious for one ordinarily skilled in the art at the time the invention was made to combine Taubin's 3D medical imaging reconstruction system with the CT imaging system of Pan since Pan's CT imaging is just an example of a medical imaging system.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Fujiwara et al. (US 2002/0190986) teaches a method for generating 3D shape data or volume data.

b. Roberge et al. (4,991,093) teaches a method for producing tomographic images using direct Fourier inversion.

c. Essock et al. (US 7,139,602) teaches a shape analysis of surfaces.

Contact Information

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Claire Wang whose telephone number is 571-270-1051. The examiner can normally be reached on Mid-day flex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella can be reached on 571-272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Claire Wang
12/19/2007